

What is claimed is:

1. A process for preparing a nickel-base, iron-base, or cobalt-base alloy ingot for hot working comprising the steps of:

providing a cast ingot, said ingot having a longitudinal surface and first and second end surfaces;

inserting said ingot into a metal canister that is adapted to contain said ingot, said ingot being positioned within said steel canister so as to provide an annular space between said ingot and the metal canister;

filling said annular space with a metal powder that is selected to readily bond with the surfaces of said ingot and said metal canister;

closing the metal canister with said ingot and said metal powder inside;

removing gas and moisture from the interior of said metal canister; and then hot isostatically pressing said metal canister with said ingot and said metal powder inside to form an assembly having a cladding formed about the entire longitudinal and end surfaces of said ingot.

2. A process as set forth in Claim 1 comprising the step of providing a layer of the metal powder inside said metal canister before said inserting step such that said layer of metal powder is also between the first end of said ingot and a closed end of said metal canister after the ingot is inserted into said metal canister.

3. A process as set forth in Claim 2 comprising the step of providing a second layer of the metal powder on the second end of said ingot after said inserting step.

4. A process as set forth in Claim 3 wherein the closing step comprises the steps of placing a metal cover over an open end of said canister and then welding the metal cover to said canister.

5. A process as set forth in Claim 4 wherein the closing step further comprises the steps of providing an opening in said metal cover and attaching a tube to said metal cover in said opening.
6. A process as set forth in Claim 1 wherein the step of removing moisture from the interior of the metal canister comprises the step of applying a vacuum to the interior of the metal canister.
7. The process set forth in Claim 6 wherein the step of removing the moisture further comprises the step of heating the metal canister at an elevated temperature.
8. The process set forth in Claim 7 wherein the heating step comprises heating the metal canister at an elevated temperature of about 250-400°F.
9. The method set forth in Claim 1 wherein the step of hot isostatically pressing the metal canister is performed under conditions of pressure, temperature, and time selected to consolidate the metal powder to substantially full density and effect bonding of the metal powder to the superalloy ingot and the metal canister.
10. A process for hot working a superalloy ingot comprising the steps of:
providing a cast ingot of a superalloy, said ingot having a longitudinal surface and first and second end surfaces;
inserting said ingot into a metal canister that is adapted to contain said ingot, said ingot being positioned within said metal canister so as to provide an annular space between said ingot and the metal canister;
filling said annular space with a metal powder that is selected to readily bond with the surfaces of said ingot and said metal canister;
closing the metal canister with said ingot and said metal powder inside;
removing gas and moisture from the interior of said metal canister;

hot isostatically pressing said metal canister with said ingot and said metal powder inside to form an assembly having a cladding formed about the entire ingot;
heating the assembly to a temperature suitable for hot working the superalloy;
and then
mechanically working the assembly to a desired shape and size.

11. A process as set forth in Claim 1 comprising the step of providing a layer of the metal powder inside said metal canister before said inserting step such that said layer of metal powder is also between the first end of said ingot and a closed end of said metal canister after the ingot is inserted into said metal canister.

12. A process as set forth in Claim 11 comprising the step of providing a second layer of the metal powder on the second end of said ingot after said inserting step.

13. A process as set forth in Claim 12 wherein the closing step comprises the steps of placing a metal cover over an open end of said metal canister and then welding the metal cover to said metal canister.

14. A process as set forth in Claim 13 wherein the closing step further comprises the steps of providing an opening in said metal cover and attaching a tube to said metal cover in said opening.

15. A process as set forth in Claim 10 wherein the step of removing moisture from the interior of the metal canister comprises the step of applying a vacuum to the interior of the metal canister.

16. The process set forth in Claim 15 wherein the step of removing the moisture further comprises the step of heating the metal canister at an elevated temperature.

17. The process set forth in Claim 16 wherein the heating step comprises heating the metal canister at an elevated temperature at about 250-400°F.
18. The method set forth in Claim 10 wherein the step of hot isostatically pressing the metal canister is performed under conditions of pressure, temperature, and time selected to consolidate the metal powder to substantially full density and effect bonding of the metal powder to the superalloy ingot and the steel canister.
19. An assembly for facilitating hot working of a superalloy ingot comprising:
an ingot formed of a superalloy;
a layer of cladding surrounding said superalloy ingot; and
a layer of consolidated metal powder disposed between the ingot and the cladding layer and bonded to said ingot and said layer of cladding.
20. An assembly as set forth in Claim 19 wherein the superalloy is selected from the group consisting of nickel-base superalloys, cobalt-base superalloys, and iron-base superalloys.
21. An assembly as set forth in Claim 19 wherein the cladding is formed from a steel alloy.
22. An assembly as set forth in Claim 19 wherein the metal powder is a corrosion resistant alloy powder.
23. An assembly as set forth in Claim 22 wherein the corrosion resistant alloy powder is selected from the group consisting of austenitic stainless steel alloy powder, superalloy powder, non-ferrous corrosion resistant alloy powder, and combinations thereof.

24. An assembly as set forth in Claim 22 which is formed by the process of Claim 1.